Geometry – Notes and Ws- Parallel lines and angle proofs (Day 2)

Name ____________________________________

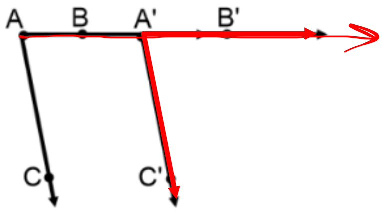
Date ____________________ Per ____________

1. The following translation of $\angle$ BAC has been performed: $T_{\overrightarrow{AB}}$

Explain how this transformation demonstrates one of the following:

If a pair of lines is parallel, then corresponding angles are congruent.

If corresponding angles are congruent, then the pair of lines is parallel.



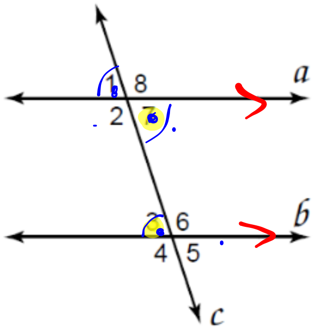
$T_{\overrightarrow{AB}}$ = TRANSLATE ALONG $\overrightarrow{AB}$

TRANSLATIONS ARE ISOMETRIC, $\angle BAC \cong \angle B'A'C'$

$\angle BAC$ & $\angle B'A'C'$ ARE CORRESPONDING $\angle$S,

SO $\overline{AC} \parallel \overline{A'C'}$

2. Prove that parallel lines make alternate interior angles congruent. (You cannot use if lines // → alt interior $\angle$s ≅, but you can use vertical and corresponding $\angle$ theorems)



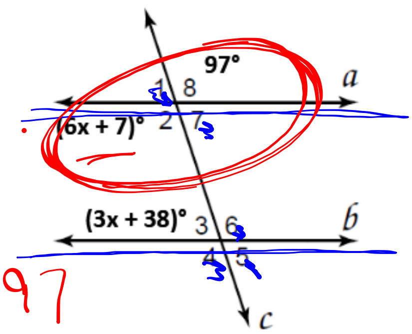
Given: a//b

Prove: $\angle 7 \cong \angle 3$

$\angle 1 \cong \angle 7$

Statements	Reasons
① a // b	① GIVEN
② $\angle 2$ & $\angle 7$ ARE SUPPLEMENTS	② LINEAR PAIR
③ $\angle 2$ & $\angle 3$ ARE SUPP	③ SSI
④ $\angle 7 \cong \angle 3$	④ ≅ SUPP. POST.

3. Is a//b? Explain why or why not with complete sentences, using the following terms: vertical angles, alternate interior angles, or corresponding angles. Show the work that helped lead you to your conclusion.



For a // b : $\angle 2 + \angle 3 = 180°$

$(6x+7) + 3x + 38 = 180°$ 97

$9x + 45 = 180$

$9x = 135$

$x = 15$ → a // b

If x = 15

$6(15) + 7 = 97$

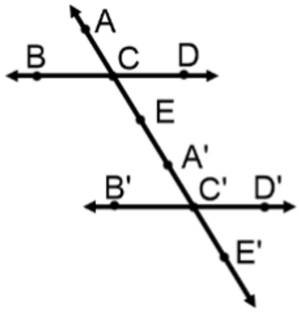
$90 + 7 = 97$

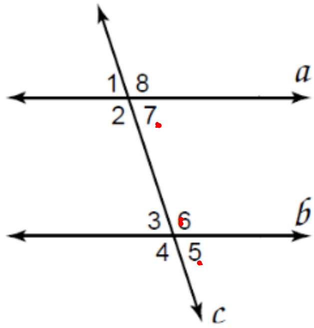
$97 = 97$

4. The following translation of $\angle$DCE has been performed:. $T_{\overrightarrow{AE}}$

Explain how this transformation demonstrates one of the following:

If a pair of lines is parallel, then alternate interior angles are congruent.
If alternate interior angles are congruent, then the pair of lines is parallel.





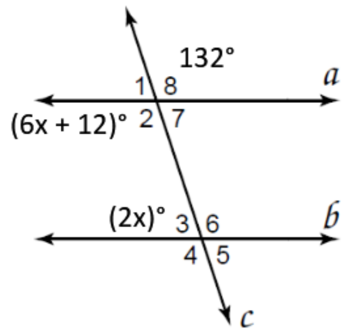
5. Prove that parallel lines make corresponding angles congruent. (You cannot use if lines // → corresponding $\angle$s congruent, but you can use vertical and alternate interior angle theorems)

Given: a//b

Prove: $\angle 7 \cong \angle 5$

Statements	Reasons

6. Is a//b? Explain why or why not with complete sentences, using the following terms: vertical angles, alternate interior angles, or corresponding angles. Show the work that helped lead you to your conclusion.



Geometry – Notes and Worksheet - Parallel lines and angle proofs

Name Key

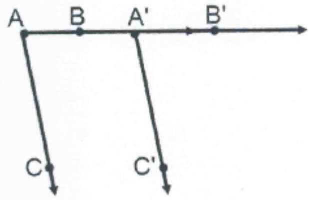
Date ____________ Per ________

1. The following translation of ∠ BAC has been performed:. $T_{\overline{AB}}$

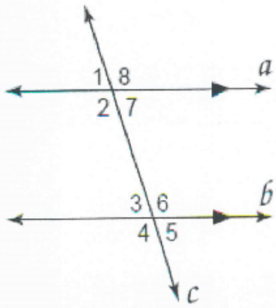
Explain how this transformation demonstrates one of the following:

If a pair of lines is parallel, then corresponding angles are congruent.

If corresponding angles are congruent, then the pair of lines is parallel.



Since we know that translations are isometric, ∠BAC ≅ ∠B'A'C'. Because ∠BAC ≅ ∠B'A'C' and those ∠s are corresponding angles, it demonstrates corr ∠s ≅ → lines //.



2. Prove that parallel lines make alternate interior angles congruent. (You cannot use if lines // →alt interior ∠s ≅, but you can use vertical and corresponding ∠ theorems)

Given: a//b

Prove: ∠7 ≅ ∠3

Statements	Reasons
1. a // b	1. Given
2. ∠7 ≅ ∠5	2. if lines // → corr ∠s ≅
3. ∠3 ≅ ∠5	3. vertical ∠s ≅ / vert ∠ thm
4. ∠7 ≅ ∠3	4. Substitution

∴ because ∠7 and ∠3 are alternate interior angles, lines // → AIA ≅

3. Is a//b? Explain why or why not with complete sentences, using the following terms: vertical angles, alternate interior angles, or corresponding angles. Show the work that helped lead you to your conclusion.

$97 = 6x + 7$

$-7 \quad -7$

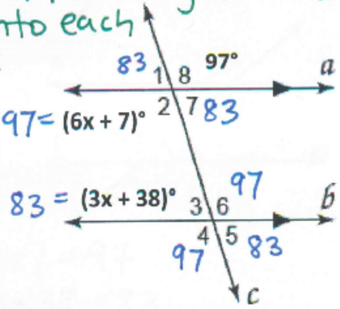
$\frac{90}{6} = \frac{6x}{6}$

$15 = x$

$\angle 2 = 6(15) + 7 = 97$

$\angle 3 = 3(15) + 38 = 83$

I used 97 = 6x + 7 since they are vertical angles and ≅. Once I found x = 15, I substituted it into each algebraic expression. I then filled out ∠s 1, 2, 7 + 8 using Vertical ∠s ≅ and straight ∠s add to 180°. Since ∠7 ≅ ∠3 and Alt. Int. ∠s ≅ → lines //, a // b.

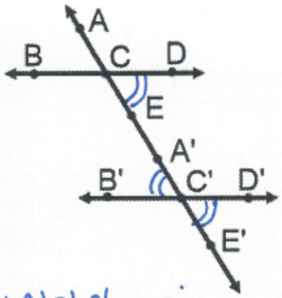


4. The following translation of $\angle DCE$ has been performed:. $T_{\overrightarrow{AE}}$

Explain how this transformation demonstrates one of the following:

If a pair of lines is parallel, then alternate interior angles are congruent.

If alternate interior angles are congruent, then the pair of lines is parallel.

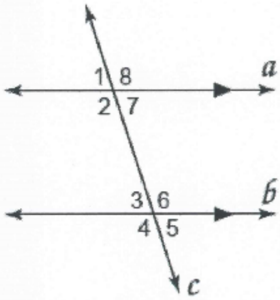


$\angle DCE \cong \angle D'C'E'$ since translations are isometric.
$\angle D'C'E' \cong \angle A'C'B'$ because vertical $\angle$s are $\cong$.
Since $\angle D'C'E' \cong$ both $\angle DCE$ and $\angle A'C'B'$, $\angle DCE \cong \angle A'C'B'$ using substitution. Because $\angle DCE \cong \angle A'C'B'$ and those $\angle$s are Alternate interior $\angle$s, AIA $\cong \rightarrow$ lines //.

5. Prove that parallel lines make corresponding angles congruent. (You cannot use if lines // → corresponding $\angle$s congruent, but you can use vertical and alternate interior angle theorems)

Given: a//b

Prove: $\angle 7 \cong \angle 5$



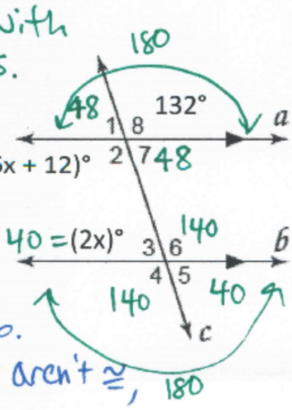
Statements	Reasons
1. a//b	1. Given
2. $\angle 7 \cong \angle 3$	2. lines // → AIA $\cong$
3. $\angle 5 \cong \angle 3$	3. vertical $\angle$s $\cong$ / vert. $\angle$ thm
4. $\angle 7 \cong \angle 5$	4. Substitution

6. Is a//b? Explain why or why not with complete sentences, using the following terms: vertical angles, alternate interior angles, or corresponding angles. Show the work that helped lead you to your conclusion.

Since we don't know if a//b, we need to start with $6x+12=132$ because they are $\cong$ vertical $\angle$s.

$$6x+12=132$$
$$-12 \quad -12$$
$$\frac{6x}{6}=\frac{120}{6}$$
$$x=20$$

Once I plug in $x=20$ into the algebraic expressions, I get $\angle 2=132$ and $\angle 3=40°$. I use vertical $\angle$s and straight $\angle$s to fill in the $\angle$s around $\angle 1,2,7,8$ and $\angle 3,4,5,6$.



$\angle 2 = 6(20)+12 = 132$

$\angle 3 = 2(20) = 40$

$180-32 = 48$

$\angle 7$ and $\angle 5$ are corresponding $\angle$s and aren't $\cong$, so a $\not\parallel$ b.